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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/527,711

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Akikazu Matsumoto

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HARNESS, DICKEY & PIERCE, P.L.C.

P.O. BOX 8910

RESTON, VA 20195

EXAMINER

LEE, DORIS L

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/527,711	Applicant(s) MATSUMOTO ET AL.	
	Examiner Doris L. Lee	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 March 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 14-20 is/are pending in the application.
- 4a) Of the above claim(s) 1-5, 10-12, 18 and 19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6-9, 14-17 and 20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>06302005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The new grounds of rejection set forth below are necessitated by applicant's amendment filed on March 20, 2009. In particular, claim 6 which has been amended to include new limitations of the crystalline organic polymer and the substance containing the metal ion. Also, claims 14-17 and 20 have been amended to depend from claim 6 and not claim 13 as previously presented. This combination of limitations was not present in the original claims. Thus, the following action is properly made final.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior office action.

Claim Objections

3. **Claim 14** is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 6, from which claim 14 depends from, already limits the substance containing the metal ion is a metal hydroxide. Appropriate correction is required.
4. **Claims 15 and 20** are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 6, from which claim 14 depends from, already recites that the mixing is conducted by

impregnating or dispersing crystalline organic polymer in the solution containing the metal ion. Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. **Claims 6, 9, 14-15 and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Matsumoto et al, *Nature*, vol. 405, May 18, 2000, pages 328-330** in view of **Kotelnikova et al, *Cellulose Chem. Technol.*, 36, 5-6, 445-458 (2002)**.

Regarding claim 6, 9, 14-15 and 20, Matsumoto teaches an organic polymer having a lamellar crystalline structure having an acidic group (page 328), it also teaches that the polymer is intercalated with alkylamines (page 328), however it fails to teach a method for producing a polymer with dispersed fine particles in which metal fine particles are dispersed in an organic polymer. Matsumoto teaches that the polymer is a polymer of a diene having a carboxylic group (page 329).

Kotelnikova teaches a crystalline polymer matrix made of cellulose (Abstract) in which fine metal particles are dispersed via the following method:

The crystalline polymer is mixed with a substance containing the metal ion and then the metal ion is reduced to obtain the fine metal particles (page 447, Experimental, Materials and procedure section). It is noted that in the experimental section of Kotelnikova, silver nitrate is mixed with a solvent of water, NH₄OH, DMSO and glycerol; when silver nitrate is mixed with NH₄OH, it is noted that silver hydroxide is necessarily present in the mixture due to the disassociation/re-association of ions in an aqueous media.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to use the process as taught by Kotelnikova and apply it to the composition of Matsumoto. One would have been motivated to do so in order to make the polymer of Matsumoto exhibit electric and/or magnetic properties (page 445, paragraph 1). They are combinable because they are concerned with the same field of endeavor, namely crystalline polymers with intercalated materials.

6. **Claims 7 and 8** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Matsumoto et al, *Nature*, vol. 405, May 18, 2000, pages 328-330** in view of **Kotelnikova et al, *Cellulose Chem. Technol.*, 36, 5-6, 445-458 (2002)** and **Won et al (JP 2002-179931, please refer to the machine translation for the references)**

The discussion regarding Matsumoto and Kotelnikova in paragraph 5 above is incorporated here by reference.

Regarding claim 7, modified Matsumoto teaches that silver ions are directly reduced (Kotelnikova, page 447) and indicates that different reduction methods may be tried (Kotelnikova, page 447), however, does not teach that the reduction can be by photoreduction.

Won teaches a polymer matrix ([0001]) in which silver is incorporated ([0015]) and is reduced by photo irradiation ([0014]).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to reduce the silver by photoreduction as taught by Won during the process as taught by modified Matsumoto. As these two methods both reduce silver ions in the matrix of a polymer, it is a simple substitution of one known element for

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another to obtain predictable results. KSR v. Teleflex, 550 U.S. ___, 82 USPQ2d 1385 (2007).

Regarding claim 8, modified Matsumoto teaches modified Matsumoto teaches that metal ions are directly reduced by a reducing agent (Kotelnikova, page 447), and modified Matsumoto teaches that different metals can be used such as silver, copper, nickel, etc (Kotelnikova, page 446, line 6) however, it fails to teach that the metal ions are platinum.

Won teaches a polymer matrix ([0001]) in which silver, copper, gold or platinum ([0015]) is incorporated ([0015]) into the metal matrix.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to use the platinum as taught by Won to replace the silver in the composition of modified Matsumoto. As these two metals are comparable as indicated by Won [0015]), it is a simple substitution of one known element for another to obtain predictable results. KSR v. Teleflex, 550 U.S. ___, 82 USPQ2d 1385 (2007).

7. Claims 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Matsumoto et al, Nature, vol. 405, May 18, 2000, pages 328-330** in view of **Kotelnikova et al, Cellulose Chem. Technol., 36, 5-6, 445-458 (2002)** and **Seita et al (US 2004/0072015)**.

The discussion regarding Matsumoto and Kotelnikova in paragraph 5 above is incorporated here by reference.

Regarding claims 16-17, modified Matsumoto teaches an organic polymer having a lamellar crystalline structure having an acidic group (Matsumoto, page 328), it

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also teaches that the polymer is intercalated with alkylamines (Matsumoto, page 328), however it fails to teach a method for producing a polymer with dispersed fine particles in which metal fine particles are dispersed in an organic polymer as recited in claims 16-17 and 20.

Seita teaches a polymer which is not limited in any manner ([0012]) in which metal ions, such as silver nanoparticles are incorporated ([0006]), first, by immersing it in potassium hydroxide and then ion exchanging in a solution of silver nitrate (Table 5).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to use the process as taught by Seita and apply it to the composition of Matsumoto. One would have been motivated to do so in order to make the polymer of Matsumoto exhibit electric properties ([0002]). They are combinable because they are concerned with the same field of endeavor, namely crystalline polymers with intercalated materials.

Response to Arguments

8. The acceptance of the drawings is noted on the attached Office Action summary sheet, PTO-326.

9. The initialed copy of the Information Disclosure Statement filed on June 30, 2005 is included with this Office Action.

10. Applicant's arguments filed March 20, 2009 have been fully considered but they are not persuasive for the reasons as set forth below:

11. **Applicant's argument:** Matsumoto and Kotelnikova are different in that the methods have different steps in dispersing fine metal particles in the organic polymer.

Examiner's response: *The prior art teaches the same method as claimed in the present invention and is properly set forth above in the rejection of claim 6. As the applicant has failed to explicitly point out where the present invention and the prior art teaching differ, the rejection over Matsumoto and Kotelnikova is maintained.*

12. **Applicant's argument:** The obtained polymers with dispersed fine metal particles also contain different properties.

Examiner's response: *Since the applicant has failed to present data that differentiates the present invention's properties from the prior art composition's properties, the rejection over Matsumoto and Kotelnikova is maintained.*

13. **Applicant's argument:** The organic polymer of claim 6 is a crystalline polymer and as such, is different from the polymers (matrix and resin matrix) used in Matsumoto and Kotelnikova.

Examiner's response: *Both Matsumoto and Kotelnikova teach crystalline polymers in their respective abstracts.*

Conclusion

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Doris L. Lee whose telephone number is (571)270-3872. The examiner can normally be reached on Monday - Thursday 7:30 am to 5 pm and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571)272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Doris L Lee/
Examiner, Art Unit 1796

/Vasu Jagannathan/
Supervisory Patent Examiner, Art Unit 1796